

Remarks/Arguments

Reconsideration and allowance of the subject application are respectfully requested.

Claims 12, 13 and 15 have been amended. Claims 1 to 11, 14 and 16 to 27 have been cancelled without prejudice or disclaimer. Claims 28 to 43 have been added. Claims 12, 13, 15 and 28 to 43 are now pending in the subject application. Claims 28, 35 and 41 to 43 are independent.

In the Official Action, the Examiner has rejected claims 14 to 21 under 35 U.S.C. 112, second paragraph. The preamble of new independent claim 41 submitted herewith specifies two masses, namely a first mass radially outward of the shaft and physically coupled to the shaft via a first spring and a second mass radially outward of the first mass and coupled to the first mass via a second spring and an electromagnetic bond. Applicant respectfully submits that the preamble of independent claim 41 submitted herewith addresses the Examiner's objection in this regard. Accordingly, Applicant respectfully requests that this objection be removed.

With respect to prior art, the Examiner has rejected claims 1, 11, 12, 14 and 17 to 20 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 3,637,169 to Tossman et al. ("Tossman"). Claims 13 and 21 have been rejected under 35 U.S.C. 103(b) as being unpatentable over Tossman in view of U.S. Patent No. 6,598,717 to Wang et al. ("Wang"). Applicant thanks the Examiner for indicating allowable subject matter in claims 15 and 16. Applicant however respectfully

submits that the claims now pending in the present application distinguish patentably over the cited prior art and should be allowed.

According to the Applicant's invention as defined by independent claim 28, Applicant provides a damper for mitigating torsional vibration of a shaft rotating with an angular velocity about a longitudinal axis. The damper comprises a first mass radially outward of the shaft that oscillates along an arcuate path in a plane perpendicular to the axis. A passive dampening element is coupled to the first mass and to the shaft. A second mass is radially outward of the first mass. An adjustable dampening element is coupled to the second mass and to the first mass. A feedback circuit detects relative movement between the shaft and the first mass resulting from undesired torsional vibration of the shaft and in response, adjusts the stiffness of the adjustable dampening element thereby to dampen the torsional vibration.

Tossman discloses an eddy-current nutation damper for a spacecraft comprising an elongated housing 12 having an elongated slot 13 formed therein. Magnetic structures 14 and 15 are secured to opposite sides of the housing adjacent one end thereof. The opposite end of the housing accommodates a support post 21. A bracket 27 is accommodated by the slot 13 and is mounted to the post 21. Spring fingers 26 above and below the housing 12 are also mounted on the post 21. A torsion wire 25 extending between the spring fingers 26 passes through arms 28 and 29 formed on the bracket 27. A block of magnetic material 31 that accommodates a cylindrical member is positioned between the arms such that the torsion wire 25 passes through it. Support arms 32 and 33 extend from the block 31

at different angles and are secured to a vane member 35. The vane member 35 is restrained by the torsion wire to swing in a plane normal to the spacecraft spin axis.

As the Examiner will appreciate, Tossman fails to teach or suggest the Applicant's invention as defined by independent claim 28. Tossman shows a mass radially outward of a shaft that is physically coupled to the shaft via a first spring and an electromagnetic bond. Tossman does not teach or suggest a first mass radially outward of the shaft and coupled to the shaft by a passive dampening element and a second mass radially outward of the first mass and coupled to the first mass via an active dampening element. Tossman shows a single mass i.e. vane 35 radially outward of the shaft and coupled to the shaft by an active dampening element i.e. the spring and electromagnetic bond. Accordingly, Applicant respectfully submits that independent claim 28 and the claims dependent thereon distinguish patentably over Tossman.

Wang discloses a method and apparatus for surface damping augmentation including a viscoelastic material, a hybrid constraining layer mechanically connected to the viscoelastic material and having an active material and a passive material. The active material is mechanically connected to the passive material.

As will be appreciated by the Examiner, Wang simply fails to remedy the deficiencies of Tossman. In no way does Wang teach or suggest a damper comprising a first mass radially outward of the shaft and coupled to the shaft by a passive dampening element and a second mass radially outward of the first mass and coupled to the first mass via an active dampening element. Accordingly,

Applicant respectfully submits that independent claim 28 and the claims dependent thereon distinguish patentably over Tossman and Wang and should be allowed.

New independent claims 35 and 41 recite subject matter that is also believed to distinguish patentably over Tossman and Wang for the same reasons set forth above. Accordingly, Applicant respectfully submits that these claims and the claims dependent thereon distinguish patentably over Tossman and Wang and should be allowed.

New independent claim 42 recites the subject matter of independent claim 14 and allowable dependent claim 15. New independent claim 43 recites the subject matter of independent claim 14 and allowable dependent claim 16. Accordingly, Applicant respectfully submits that these claims distinguish patentably over Tossman and Wang.

In view of the above, it is believed the application is in order for allowance and action to that end is respectfully requested.

Please charge any deficiency or credit any overpayment in the fees for this amendment to our Deposit Account No. 20-0090.

Respectfully Submitted,

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